

Q16: B
Q17: B
Q18: D

Q19: D

Q19: A

Q20: C

Q17: C

Q18: C

1(a)	letter A: example of substance = carbon dioxide / oxygen ; letter D: type of movement = active transport ; letter D: part of membrane involved = carrier / pump, protein <u>and</u> example of a substance = sodium ions ; R sodium-potassium pump A potassium ions / chloride / amino acids A sodium pump (if sodium is example) A glucose if not given for letter C letter C: example of a substance = glucose ; A amino acids / chloride (ions) / potassium ions / sodium ions part of membrane involved: for B = channel protein <u>and</u> for C = carrier protein ;
1(b)	any two from viruses travel through symplast pathway ; I apoplast pathway if described correctly R symplast <u>and</u> apoplast pathways if no further detail of apoplast given plasmodesmata / cytoplasmic connections between cells ; A strands of cytoplasm because viruses are small enough (to pass through plasmodesmata) ; AVP ; A any ref. to actual size (width of plasmodesmata ~ 50 nm, width of Tobacco Mosaic Virus 18 nm)

1(a)	any sensible concentrations ; corresponding volumes of distilled water <u>and</u> sucrose;									
1(b)	<i>any seven from:</i> 1 same / stated, variety / age / AW, of beetroots ; 2 remove the outer skin (of the beetroot) / AW ; 3 same / stated, dimensions / AW, of (beetroot) block / AW ; 4 <i>ref. to</i> apparatus for obtaining same size of (beetroot) blocks ; 5 for each sucrose concentration, place (beetroot) block in a suitable container <u>and</u> submerge / AW (in sucrose solution); 6 (for each sucrose concentration) measure the initial mass <u>and</u> the final mass ; 7 (measure final mass) after a (suitable) stated time ; 8 method to remove excess liquid from beetroot (before measuring final mass) ; 9 use at least three different (beetroot) blocks <u>and</u> calculate a mean, for each sucrose concentration ; 10 safety comment with named hazard <u>and</u> risk <u>and</u> precaution ; <table><tr><td>hazard</td><td>risk</td><td>precaution</td></tr><tr><td>beetroot</td><td>allergy / irritant</td><td>gloves / mask / PPE</td></tr><tr><td>knife / scalpel / cork borer / AW</td><td>cut</td><td>cut away from the hand / cut onto a, board / tile / AW</td></tr></table>	hazard	risk	precaution	beetroot	allergy / irritant	gloves / mask / PPE	knife / scalpel / cork borer / AW	cut	cut away from the hand / cut onto a, board / tile / AW
hazard	risk	precaution								
beetroot	allergy / irritant	gloves / mask / PPE								
knife / scalpel / cork borer / AW	cut	cut away from the hand / cut onto a, board / tile / AW								
1(c)(i)	1 appropriate axis labels <u>and</u> units ; 2 sketch shows decreasing line crossing x-axis ;									
1(c)(ii)	(identify the) x-axis intercept point or (identify the point on the x-axis where the mean) percentage change in mass is zero ;									
1(c)(iii)	rinse (beetroot) blocks (after cutting / before adding to sucrose solution) ;									